

NEW RECORDS OF SCOLYTIDAE FROM WASHINGTON STATE

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ABSTRACT.—Eighteen species of Scolytidae are reported from Washington state for the first time or raised from obscurity: *Scierus annectens* LeConte, *Hylesinus californicus* (Swaine), *Phloeotribus lecontei* Schedl, *Carphoborus randykei* Bruck, *Polygraphus rufipennis* (Kirby), *Crypturgus borealis* Swaine, *Pityogenes knecheli* Swaine, *Ips mexicanus* (Hopkins), *Ips perturbatus* (Eichhoff), *Ips plastographus plastographus* (LeConte), *Ips woodi* Thatcher, *Trypodendron betulae* Swaine, *Trypophloeus striatulus* (Mannerheim), *Procryphalus mucronatus* (LeConte), *Procryphalus utahensis* Hopkins, *Pseudopityophthorus pubipennis* (LeConte), *Pityophthorus alpinensis* G. Hopping, and *Pityophthorus grandis* Blackman. Host tree and collection data are given for these species. A total of 105 scolytid species known from Washington are listed.

Key words: *Scolytidae, faunal list, Washington state.*

Washington is a large state with seven physiographic provinces (Franklin and Dyrness 1973), ranging from sea level (Puget Trough) to over 4450 m on Mount Rainier (southern Washington Cascades). Under the influence of moisture, temperature, and substrate, natural vegetation types range from coniferous forests through woodland to shrubsteppe. Along Washington's western edge, the Coast Range and Olympic Mountains intercept the moisture-laden prevailing winds from the Pacific Ocean, helping to make the temperate forests of western Washington (and northern Oregon) the most dense in the world. They are composed almost exclusively of conifers and in that respect are also unique among temperate forests. Eastward lies the Cascade Range that contains Mount Rainier and other volcanic peaks. Mixed conifers prevail in these mountain ranges. Farther east is the Columbia Basin, largest and most arid of the provinces, occupying virtually the southeast quarter of the state, except for a bulge of the Blue Mountains extending northward from Oregon. Trees of this province are restricted mainly to water courses and urban areas. North of the Columbia Basin is the Okanogan Highlands province, bordering on British Columbia and Idaho, which provides a vegetational bridge to the more diverse northern Rocky Mountain flora.

The provinces of Washington vary greatly in their climate, resulting from complex interplay between maritime and continental air

masses and the mountain ranges, particularly the Cascade Range that divides the state into eastern and western parts. For example, Quinalt on the Pacific side of the Coast Range receives 337 cm of precipitation annually, whereas Yakima, in the rain shadow to the east of the Cascade Range, has only 20 cm. Average January and July temperatures for Seattle (Puget Trough) are 4.5 °C and 18.7 °C, whereas those for Yakima (Columbia Basin) are –2.5 °C and 21.7 °C.

The Scolytidae of Washington are host specific to varying degrees, and the extent of their diversity is related to the diversity of their woody host plants. Conifers are hosts of 87 species listed herein. A majority of these (81 species) are restricted to one or a few species of Pinaceae in the genera *Abies*, *Larix*, *Picea*, *Pinus*, *Pseudotsuga*, and *Tsuga*, while six species infest Cupressaceae (*Thuja*, *Chamaecyparis*, and *Juniperus*). The remaining 19 species infest angiosperms (*Populus*, *Salix*, *Alnus*, etc.). By their habits, Washington Scolytidae are characterized as true bark beetles, living in phloem (90 species); ambrosia beetles, living in xylem where they may feed entirely or partly on symbiotic fungi that they transmit (13 species), living in pine cones (*Conophthorus ponderosae* Hopkins), or living in the roots of red clover (*Hylastinus obscurus* [Marsham]).

Patterson and Hatch (1945) listed 73 species of Washington Scolytidae, adjusted to present-day synonymy. Wood (1971, 1982) lists

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Washington in the distribution of 82 species of Scolytidae; six additional species are listed by Wood and Bright (1992). We herein update those publications with 15 new state records collected by us or found in museum collections, and three species collected by M. A. Deyrup (personal communication). Similar lists have been published for Idaho (Furniss and Johnson 1987), Montana (Gast et al. 1989), and Oregon (Furniss et al. 1992).

Additional species of Scolytidae are likely to be collected in Washington in the future. They may include species known to occur in adjacent states or British Columbia, hosts of which occur in contiguous areas of Washington. Also, commerce from foreign countries entering Puget Sound and the Columbia River may bring exotic species accidentally. Species that infest xylem (ambrosia beetles) are especially well adapted to such transport. The establishment of ambrosia beetles, which typically are not very host-specific, is enhanced by the moderate climate and great diversity of native and exotic flora in the Seattle area. Indeed, it is probable that such introduced scolytids may have already gained a foothold there and have not yet been detected.

The following are abbreviations for repositories listed for specimens new to Washington: ABS = Archbold Biological Station, Lake Placid, FL; FS-RI = Forest Service, USDA, Region I, Missoula, MT; PNW = Pacific Northwest Forest and Range Experiment Station, Forest Service, USDA, Corvallis, OR; SLW = S. L. Wood, Brigham Young University, Provo, UT; WFBM = W. F. Barr Entomological Museum, University of Idaho, Moscow, ID.

SPECIES NEW TO WASHINGTON

Subfamily *Hylesininae*

Scierus amoectens LeConte

BIOLOGY.—Monogynous. Infests lower bole and roots of felled *Picea* spp., rarely *Pinus contorta*, often by entering a gallery of *Dendroctonus rufipennis* (Kirby). The parent gallery is 3–4 cm long, inclined diagonally across grain. One generation per year (Stewart 1965).

DISTRIBUTION AND NOTES.—CANADA: Alta., B.C., N.B., Newf., Ont., Que., N.W.T.; USA: Alas., Ariz., Calif., Colo., Ida., Me., Mont., N.H., N.M., Ore., Ut.; WASHINGTON: Tieton Ranger Station, Yakima Co., 17-VIII-1955, *Picea engelmannii*, K. H. Wright (4 PNW, 1 WFBM).

Hylesinus californicus (Swaine)

BIOLOGY.—Monogynous. Infests the bole and limbs of *Fraxinus* spp. Egg galleries are transverse and deeply engrave the wood. Overwintering beetles evidently form feeding tunnels in green bark of *Fraxinus* spp. (Wood 1982).

DISTRIBUTION AND NOTES.—MEXICO: Chih.; USA: Ariz., Calif., Colo., N.D., N.M., Okla., Ore., Tex., Ut.; WASHINGTON: Pack Forest, La Grande, Pierce Co., 10-V-1941, *Fraxinus latifolia* (=oregona), R. L. Furniss. Two trap trees, 4" and 7" diameter, felled 4-III-1941. Pairs of beetles and eggs present in 2.5-cm galleries 10-V-1941. Ten km N Adna, Lewis Co., 14-VII-1991, *Fraxinus latifolia*, M. M. Furniss and J. B. Johnson (approx. 100 WFBM, 2 SLW). Infesting underside of a 12-cm-diameter broken-off branch on ground. Galleries each with a female and male parent, eggs present. Adult progeny reared, some larvae tunneled into xylem for a depth of four annual growth rings before transforming to adults.

Phloeotribus lecontei Schedl

BIOLOGY.—Monogamous. Male constructs an entrance tunnel and the bases of two egg galleries that are then completed by the female. Egg galleries run obliquely across the grain of shaded-out branches in merchantable-size living trees. Adults and larvae may be present throughout the year; overwintering adults may occur in brood galleries, special hibernation or maturation tunnels, or newly formed parental galleries (Wood 1982).

DISTRIBUTION AND NOTES.—CANADA: Alta., B.C.; USA: Ariz., Calif., Colo., Ida., Mont., N.M., Ore., Ut., Wyo.; WASHINGTON: 7 km S Harts Pass, Okanogan Co., 5-VII-1988, *Picea engelmannii*, M. M. Furniss (1 WFBM). Collected from a branch of a 60-cm-diameter wind-felled tree. Horseshoe Lake, Skamania Co., 17-VII-1991, *Picea engelmannii*, M. M. Furniss and J. B. Johnson (9 WFBM). New attacks in 1-cm-diameter shaded-out branch, without needles, attached to live tree. Swank Pass, Blewett, Chelan Co., 11-V-1975, *Abies grandis*, M. A. Deyrup (ABS). In a small branch. Same locality and date, *Pseudotsuga menziesii*, M. A. Deyrup (ABS). In a shaded-out branch.

Carphoborus vandykei Bruck

BIOLOGY.—Polygynous, unstudied. Members of the genus infest small, shaded-out branches of living trees or boles of small, suppressed,

unthrifty trees. Most species live in host tissue that is drier than is typical for bark beetles (Wood 1982).

DISTRIBUTION AND NOTES.—CANADA: B.C.; USA: Calif., Ore.; WASHINGTON: Heritage Campground, Olympia, Thurston Co., 14-VII-1991, *Pseudotsuga menziesii*, M. M. Furniss and J. B. Johnson (approx. 200 WFBM). Infesting a 2.3-m-long, 6-cm-diameter, broken-off branch with red foliage. Also present was *Pseudohylesinus nebulosus* LeConte. Two to four egg galleries radiated from the central nuptial chamber, deeply etching the sapwood. Egg galleries each extended 2–5 cm, their length inversely dependent upon attack density. Eggs present, laid alternately on opposite sides (not opposite each other) in deep niches at a rate of 6 per cm and sealed with a reddish brown coating of frass. Hatched larvae fed in the phloem, not etching the wood. Some larval mines equaled or exceeded the length of egg galleries but most were shorter and very broad, apparently influenced by brood density. Kept at room temperature, adult brood pulverized the bark and deeply scored the xylem before emerging from very dry branch-wood one and one-half years later. The scored xylem had a powdery white appearance, perhaps due to presence of associated yeast. Carson, Skamania Co., 18-VII-1991, *Pseudotsuga menziesii*, M. M. Furniss and J. B. Johnson (approx. 100 WFBM). Infesting 1–2 1/2-cm-diameter branches of a 25-cm-diameter standing tree that had discolored foliage (dying). Galleries with parent beetles and larvae. Phloem very dry. Little Rock, Thurston Co., 30-IV-1975, *Pseudotsuga menziesii*, M. A. Deyrup (ABS). In a dead branch. Tahuya, Mason Co., 21-VI-1975, *Pseudotsuga menziesii*, M. A. and N. Deyrup (ABS). In a small, suppressed tree.

Polygraphus rufipennis (Kirby)

BIOLOGY.—Polygynous. Recorded commonly from *Picea* spp., especially *P. glauca* and *P. engelmannii*, rarely from other genera of Pinaceae. Occasionally kills small-diameter, suppressed trees, commonly occurs as a secondary species in trunks of felled or dying trees. Two to five egg galleries radiate from each nuptial chamber, most commonly two, each made by a different female. One generation per year (Hilton 1968).

DISTRIBUTION AND NOTES.—CANADA: all provinces; USA: Alas., Ariz., Colo., D.C., Ida.,

Me., Mass., Mich., Minn., Mont., N.H., N.M., N.Y., N.C., N.D., Ore., Penn., S.D., Tenn., Ut., Ver., W.V., Wisc., Wyo.; WASHINGTON: Evans Creek, King Co.; Nacotta, Pacific Co. (Hilton 1968). Kooskooskie, Walla Walla Co., 28-IX-1955, *Picea engelmannii*, W. J. Buckhorn. Lake Wenatchee, Chelan Co., 22-IX-1955, *Picea engelmannii*, P. W. Orr. Metaline Falls, Pend Oreille Co., 1929–1931, *Picea engelmannii* and *Pseudotsuga menziesii*, H. J. Rust and W. D. Bedard. Parkway, Pierce Co., 17-V-1934, *Pinus contorta*, J. A. Beal. Plain, Chelan Co., 19-IX-1955, *Picea engelmannii*, P. W. Orr. Mt. Rainier N.P., 29-X-1930, *Picea engelmannii*, F. P. Keen and W. J. Buckhorn. Winthrop, Okanogan Co., 22-X-1935, *Picea engelmannii*, R. L. Furniss (all PNW). Horseshoe Lake, Skamania Co., 17-VII-1991, *Picea engelmannii*, M. M. Furniss and J. B. Johnson. Infesting shaded-out branches of a 60-cm-diameter, wind-felled tree (3 WFBM).

COMMENT.—This common beetle is certain to occur throughout the range of *P. engelmannii* in the Cascade Range and Okanogan Highlands. The Pacific Co. record is likely to be in *P. sitchensis*; if so, it is a new host record.

Subfamily Scolytinae

Crypturgus borealis Swaine

BIOLOGY.—Monogamous. This smallest Washington scolytid enters galleries of other bark beetles in stems of conifers (*Abies*, *Picea*, *Pinus*). They then tunnel irregularly into the phloem. Apparently one generation per year, overwintering as adults in the brood galleries (Wood 1982).

DISTRIBUTION AND NOTES.—CANADA: Alta., B.C., Man., N.B., NWT, N.S., Ont., Que., Sask.; USA: Ariz., Colo., Ida., Me., Mich., Mo., Mont., N.M., N.Y., Ore., Penn., S.D., Ut.; WASHINGTON: Harts Pass, Okanogan Co., 5-VII-1988, *Abies lasiocarpa*, M. M. Furniss (6 WFBM). Infesting lower trunk of a 30-cm-diameter standing tree having orangish red foliage and new attacks by *Pityokteines* sp. Seventeen km W Mazama, Okanogan Co., 12-VII-1991, *Abies lasiocarpa*, M. M. Furniss and J. B. Johnson (3 WFBM). Infesting lower trunk of a 25-cm-diameter standing tree having red foliage and abandoned galleries of another scolytid, either *Pityophthorus* sp. or *Pityokteines* sp.

Pityogenes knechteli Swaine

BIOLOGY.—Polygynous. The egg gallery is stellate with 4 to 6 branches radiating from the

nuptial chamber. Overwintering stages include larvae, pupae, and adults (Alberta, Canada). One and a partial second generation occur per year at that latitude (Reid 1955).

DISTRIBUTION AND NOTES.—CANADA: Alta., B.C., Sask.; USA: Ariz., Calif., Ida., Mont., Ore., Ut., Wyo.; WASHINGTON: Twisp, Okanogan Co., 12-VIII-1930, *Pinus contorta*, F. P. Keen (2 PNW).

Ips mexicanus (Hopkins)

BIOLOGY.—Polygynous. Not studied. Infests *Pinus* spp.; egg galleries curve outward from a central chamber (Wood 1982).

DISTRIBUTION AND NOTES.—CANADA: Alta., B.C.; MEXICO: Baja Calif., Distrito Federal, Chiapas, Dgo., Hildago, Mex., Mich., Pue., Vera.; GUATEMALA; USA: Alas., Ariz., Calif., Colo., Ida., Mont., Ore., Ut., Wyo.; WASHINGTON: Tieton Ranger Station, Yakima Co., 18-VI-1956, *Pinus albicaulis* (new host record), P. W. Orr (15 PNW, 2 WFBM). Horseshoe Lake, Skamania Co., 17-VII-1991, *Pinus contorta*, M. M. Furniss and J. B. Johnson (3 WFBM). Sparse galleries in 30-cm-diameter standing tree with dead top and mottled (dying) foliage. *Hyllurgops porosus* (LeConte) also sparse in base. Umatilla National Forest, 45 km S Pomeroy, Garfield Co., 19-VII-1991, *Pinus contorta*, M. M. Furniss and J. B. Johnson (2 WFBM). Infesting a 23-cm-diameter standing tree with red foliage. Egg gallery deeply etched xylem, its branches aligned more or less with wood grain but curving somewhat and irregular due to several turning niches. Base with moist, sour bark. Also present were *Trypodendron lineatum* (Olivier), *Dendroctonus valens* LeConte, *Orthotomicus caelatus* (Eichhoff), and *Pityophthorus confertus* Swaine. Bremerton, Kitsap Co., 21-IV-1974, *Pinus contorta*, M. A. Deyrup (ABS). In a standing, dead tree.

Ips perturbatus (Eichhoff)

BIOLOGY.—Polygynous. Breeds abundantly in *Picea glauca* logging slash and in tops of trees killed by *Dendroctonus* beetles. Parental galleries have a tuning fork pattern with moderately long larval mines. One generation annually but two sets of egg galleries may be constructed by females in one season (Furniss and Carolin 1977).

DISTRIBUTION AND NOTES.—CANADA: Alta., B.C., Man., N.B., N.W.T., Ont., Que.; USA: Ida., Me., Mass., Minn., Mont., N.H., N.J., N.Y., S.D., Wisc.; WASHINGTON: Metaline Falls, Pend Oreille Co., 31-V-1930, *Betula occidentalis*, Hopkins no. 19839 (PNW).

Ips plastographus plastographus
(LeConte)

BIOLOGY.—Polygynous. Usually infests upper side of fallen *Pinus contorta*, rarely *Pinus ponderosa*. Two or three longitudinal egg galleries radiate from each nuptial chamber. Mature larvae and young adults may bore 1 cm into wood prior to emerging (Wood 1982).

DISTRIBUTION AND NOTES.—CANADA: B.C.; USA: Calif., Ida., Ore., Mont., Wyo.; WASHINGTON: Kettle Falls, Stevens Co., IX-5-1968, Hopkins U.S. no. 54222, *Pinus ponderosa*, F. W. Honing and J. E. Dewey (FS-R1).

Ips woodi Thatcher

BIOLOGY.—Polygynous. Infests large limbs and boles of unthrifty or felled 5-needle *Pinus* spp. Egg galleries parallel, resembling a narrow tuning fork (Wood 1982).

DISTRIBUTION AND NOTES.—CANADA: Alta.; USA: Ariz., Ida., Mont., Nev., N.M., Ut., Wyo.; WASHINGTON: Tieton Ranger Station, Yakima Co., *Pinus albicaulis* (new host), 21-IX-55 to 12-VII-1956, P. W. Orr (26 PNW, 3 WFBM).

Trypodendron betulae Swaine

BIOLOGY.—Monogynous. Tunnels are constructed by females radially through bark into sapwood of *Betula* spp., rarely *Alnus* sp. The main tunnel branches at close intervals, left or right, in the same plane. Eggs are laid in niches oriented above and below the gallery. Larvae excavate short cradles in which they develop and feed on ambrosia fungus. Males are active in keeping the tunnels clean and aerated (Wood 1982).

DISTRIBUTION AND NOTES.—CANADA: Alta., B.C., Man., N.B., N.S., NWT, Ont., Que.; USA: Ida., Me., Mass., Minn., Mont., N.H., N.J., N.Y., S.D., Wisc.; WASHINGTON: Metaline Falls, Pend Oreille Co., 31-V-1930, *Betula occidentalis*, Hopkins no. 19839 (PNW).

Trypophloeus striatulus
(Mannerheim)

BIOLOGY.—Monogynous. Unstudied, infests stems of *Salix scouleriana*, *Salix* spp., *Alnus crispa*, and *A. rugosa*.

DISTRIBUTION AND NOTES.—CANADA: Newf., N.S., Que., Yukon; USA: Alas., Colo., Ida.,

Minn., Ut.; WASHINGTON: King Co., 20-VI-1976, *Populus trichocarpa*, M. A. Deyrup (ABS). In branch.

Procryphalus mucronatus
(LeConte)

BIOLOGY.—Monogamous. Infests smooth, outer bark of stems of larger, dying, standing *Populus tremuloides*. Overwinter as larvae and adults; one and one-half to two generations per year (Petty 1977).

DISTRIBUTION AND NOTES.—CANADA: Alta., B.C.; USA: Alas., Colo., Ida., Mont., Nev., N.M., Ore., Ut.; WASHINGTON: Kamiak Butte, Whitman Co., 18-VI-1944, *Populus tremuloides*, M. M. Furniss and Jianlin Zhou (4 WFBM). Infesting a 30-cm-diameter recently dead tree that had no foliage. The bark was necrotic and had an almond odor. New attacks at a density of nine per dm occurred at 10-m-height, 11-cm-diameter. Galleries contained one to two parent beetles, eggs and first instar larvae.

Procryphalus utahensis
Hopkins

BIOLOGY.—Monogynous. Unstudied, infests stems of willows, particularly *Salix scouleriana*.

DISTRIBUTION AND NOTES.—CANADA: B.C., Que.; USA: Alas., Calif., Colo., Ida., Ore., S.D., Ut.; WASHINGTON: Bremerton, Kitsap Co., 26-VII-1975, *Salix scouleriana*, M. A. Deyrup (ABS).

Pseudopityophthorus pubipennis
(LeConte)

BIOLOGY.—Monogynous. Infests bole and branches of *Quercus* spp. that are felled or recently dead. Galleries aligned horizontally across grain, averaging 5 cm long, closely spaced. Larval mines are mainly hidden in the phloem and oriented longitudinally.

DISTRIBUTION AND NOTES.—CANADA: Southern B.C. (Bright 1976); USA: Calif., Ore.; WASHINGTON: Carson, Skamania Co., 18-VI-1991, *Quercus garryana*, M. M. Furniss and J. B. Johnson (6 WFBM). Infesting a broken, 20-cm-diameter branch on ground.

Pityophthorus alpinensis
G. Hopping

BIOLOGY.—Polygynous. Infests broken branches and twigs of *Larix lyallii*, apparently one generation annually.

DISTRIBUTION AND NOTES.—CANADA: Alta.;

USA: Ida., Mont.; WASHINGTON: Harts Pass, Okanogan Co., 11-VII-1991, *Larix lyallii*, M. M. Furniss and J. B. Johnson (3 WFBM). Cadavers collected from old galleries in dead branches 0.5–2.5-cm-diameter. Galleries were branched and variable in shape, each branch containing few (9–11) egg niches; larval mines short, broad, restricted to phloem; adult brood had scored the sapwood as if by feeding.

Pityophthorus grandis
Blackman

BIOLOGY.—Polygynous, unstudied. Infests shaded-out branches and young, standing *Pinus ponderosa* (Wood 1982).

DISTRIBUTION AND NOTES.—CANADA: B.C.; USA: Ariz., Calif., Colo., Nebr., N.M., S.D., Tex., Ut.; WASHINGTON: Trout Lake, Klickitat Co., 17-VII-1991, *Pinus ponderosa*, M. M. Furniss and J. B. Johnson (4 WFBM). Infesting 4-cm-diameter standing tree with straw-color foliage. Umatilla National Forest, 53 km S Pomeroy, Garfield Co., 19-VII-1991, *Pinus ponderosa*, M. M. Furniss and J. B. Johnson (1 WFBM). Reared from stem of a small, felled tree.

WASHINGTON SCOLYTIDAE

HYLESININAE

Hylastini

- Scierus annectens* LeConte
- Scierus pubescens* Swaine
- Hybomorphus porosus* (LeConte)
- Hybomorphus reticulatus* Wood
- Hybomorphus rugipennis rugipennis* (Mannerheim)
- Hybomorphus subcostulatus subcostulatus* (Mannerheim)
- Hylastes gracilis* LeConte
- Hylastes longicollis* Swaine
- Hylastes macer* LeConte
- Hylastes nigrius* (Mannerheim)
- Hylastes ruber* Swaine

Hylesinini

- Hylesinus obscurus* (Marsham)
- Hylesinus californicus* (Swaine)
- Ahniphagus aspericollis* (LeConte)
- Ahniphagus hirsutus* Schedl

Tomicini

- Pseudohylesinus dispar pullatus* Blackman
- Pseudohylesinus granulatus* (LeConte)
- Pseudohylesinus nebulosus nebulosus* (LeConte)
- Pseudohylesinus nobilis* Swaine
- Pseudohylesinus pini* Wood
- Pseudohylesinus sericeus* (Mannerheim)
- Pseudohylesinus sitchensis* Swaine
- Pseudohylesinus tsugae* Swaine
- Xylechius montanus* Blackman
- Dendroctonus brevicomis* LeConte

Dendroctonus ponderosae Hopkins
Dendroctonus pseudotsugae Hopkins
Dendroctonus rufipennis (Kirby)
Dendroctonus valens LeConte

Phloeotribini
Phloeotribus lecontei Schedl

Phloeosinini
Phloeosinus cyprius Hopkins
Phloeosinus keeni Blackman
Phloeosinus punctatus LeConte
Phloeosinus scopulorum *scopulorum* Swaine
Phloeosinus sequoiae Hopkins
Phloeosinus serratus (LeConte)

Hypoborini
Chaetophloeus heterodoxus (Casey)

Polygraphini
Carphoborus intermedius Wood
Carphoborus ponderosae Swaine
Carphoborus vandykei Bruck
Polygraphus rufipennis (Kirby)

SCOLYTINAE

Scolytini
Scolytus laricis Blackman
Scolytus monticolae Swaine
Scolytus multistriatus (Marsham)
Scolytus opacus Blackman
Scolytus oregoni Blackman
Scolytus piccae (Swaine)
Scolytus praeceps LeConte
Scolytus rugulosus (Müller)
Scolytus subscaber LeConte
Scolytus tsugae (Swaine)
Scolytus unispinosus LeConte
Scolytus ventralis LeConte

Mieracini
Hylocurus hirtellus (LeConte)

Crypturgini
Dolurgus pumilus (Mannerheim)
Crypturgus borealis Swaine

Dryocoetini
Dryocoetes affaber (Mannerheim)
Dryocoetes autographus (Ratzeburg)
Dryocoetes betulae (Hopkins)
Dryocoetes confusus Swaine

Ipini
Pityogenes carinulatus (LeConte)
Pityogenes fossifrons (LeConte)
Pityogenes knecheli Swaine
Pityokteines elegans Swaine
Pityokteines lasiocarpi (Swaine)
Pityokteines minutus (Swaine)
Pityokteines mystacinus Wood
Pityokteines ornatus (Swaine)
Orthotomicus caelatus (Eichhoff)
Ips concinna (Mannerheim)
Ips marginatus (LeConte)
Ips integer (Eichhoff)
Ips latidens (LeConte)

Ips mexicanus (Hopkins)
Ips montanus (Eichhoff)
Ips perturbatus (Eichhoff)
Ips pini (Say)
Ips plastographus *plastographus* (LeConte)
Ips tridens *engelmanni* Swaine
Ips tridens *tridens* (Mannerheim)
Ips woodi Thatcher

Xyloterini
Trypodendron betulae Swaine
Trypodendron lineatum (Olivier)
Trypodendron retusum (LeConte)
Trypodendron rufitarsis (Kirby)

Xyleborini
Xyleborus dispar (Fabricius)
Xyleborinus saxeseni (Ratzeburg)

Cryphalini
Trypophloeus salicis Hopkins
Trypophloeus striatulus (Mannerheim)
Procryphalus mucronatus (LeConte)
Procryphalus utahensis Hopkins
Cryphalus pubescens Hopkins
Cryphalus ruficollis Hopkins

Corthylini
Pseudolityophthorus pubipennis (LeConte)
Conophthorus ponderosae Hopkins
Pityophthorus alpinensis G. Hopping
Pityophthorus confertus Swaine
Pityophthorus confinis LeConte
Pityophthorus digestus (LeConte)
Pityophthorus grandis Blackman
Pityophthorus murrayanae Blackman
Pityophthorus nitidulus (Mannerheim)
Pityophthorus pseudotsugae Swaine
Pityophthorus tuberculatus Eichhoff
Gnathotrichus retusus (LeConte)
Gnathotrichus sulcatus (LeConte)
Monarthrum scutellare (LeConte)

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LITERATURE CITED

BRIGHT, D. E., JR. 1976. The bark beetles of Canada and Alaska. The insects and arachnids of Canada, part 2. Biosystematics Research Institute, Research Board, Canada Department of Agriculture Publication 1576. 241 pp.

FRANKLIN, J. E. AND C. T. DYRNESS. 1973. Natural vegetation of Oregon and Washington. USDA Forest Service General Technical Report PNW-8. Portland, OR. 417 pp.

FURNISS, R. L. AND V. M. CAROLIN. 1977. Western forest insects. USDA, Forest Service, Miscellaneous Publication 1339. 654 pp.

FURNISS, M. M. AND J. B. JOHNSON. 1987. List of Idaho Scolytidae (Coleoptera) and notes on new records. Great Basin Naturalist 47: 375-382.

FURNISS, M. M., J. B. JOHNSON, R. L. WESTCOTT, AND T. R. TORGERSEN. 1992. List of Oregon Scolytidae (Coleoptera) and notes on new records. Great Basin Naturalist 52: 373-378.

GAST, S. J., M. M. FURNISS, J. B. JOHNSON, AND M. A. IVIE. 1989. List of Montana Scolytidae (Coleoptera) and notes on new records. Great Basin Naturalist 49: 381-386.

HILTON, D. F. J. 1968. A review of the genus *Polygraphus*. Kansas University Science Bulletin 48(2): 21-44.

PATTERSON, G. K. AND M. H. HATCH. 1945. An annotated list of the Scolytoidea of Washington. University of Washington Publication in Biology 10: 145-156.

PETTY, J. L. 1977. Bionomics of two aspen bark beetles, *Trypophloeus populi* and *Procryphalus mucronatus* (Coleoptera: Scolytidae). Great Basin Naturalist 37: 105-127.

REID, R. W. 1955. The bark beetle complex associated with lodgepole pine slash in Alberta. Canadian Entomologist 87: 311-323.

STEWART, K. W. 1965. Observations on the life history and habits of *Scierus annectens* (Coleoptera: Scolytidae). Entomological Society of America, Annals 58: 924-927.

WOOD, S. L. 1971. Family Scolytidae. Pages 395-428 in M. H. Hatch, The beetles of the Pacific Northwest. Part V. 662 pp. University of Washington Publications in Biology. Volume 16.

_____. 1982. The bark and ambrosia beetles of North and Central America (Coleoptera: Scolytidae), a taxonomic monograph. Great Basin Naturalist Memoirs No. 6. 1359 pp.

WOOD, S. L. AND D. E. BRIGHT, JR. 1992. A catalog of Scolytidae and Platypodidae (Coleoptera). Part 2: taxonomic index. Great Basin Naturalist Memoirs No. 13. 1553 pp.

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